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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/435,070	11/04/1999	BALARAM SINHAROY	AT9-98-544	4716

7590 12/01/2004

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EXAMINER	
WOOD, WILLIAM H	

ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/435,070	SINHAROY, BALARAM	
	Examiner	Art Unit	
	William H. Wood	2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10 and 21-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10 and 21-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claims 10 and 21-40 are pending and have been examined.

In view of the Appeal Brief filed on 02 September 2004, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 10 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Patt** et al., "Alternative Implementations of Hybrid Branch Predictors" in view of **Talcott** et al. (USPN 6,289,441).

In regard to claim 10, **Patt** disclosed the limitations:

- *A processing system comprising:*
  - *a first branch history table comprising a plurality of bimodally accessed entries for storing a first set of branch prediction bits* (page 253; item 2 under section 3.1);
  - *a second branch history table comprising a plurality of entries for storing a second set of branch prediction bits* (page 253, item 4, under section 3.1);
  - *a selector for selecting in response to a selection control bit selected from a set of selection control bits, a bit from a selected one of said sets of bits accessed from said first and second branch history tables* (page 255, section 4, 4.1 and Figure 2); *and*
  - *a selector table comprising a plurality of entries for storing said a set of selector bits as a function of a performance history of said first and second sets of branch prediction bits stored in said first and second branch history tables, wherein said each said entry in said tables comprises a 1-bit counter* (page 252, section 2; page 255, section 4, 4.1 and figure 2; a 1-bit counter is inherent to a 2-bit counter).

Patt did not explicitly state *fetch-based branch history table*. **Talcott** demonstrated that it was known at the time of invention to construct fetch-based branch history tables wherein a table produces a prediction value for multiple branches within a fetch group (column 3, line 58 to column 4, line 25). In **Patt**'s disclosed branch prediction scheme, it would have been obvious to one of ordinary skill in the art at the time of invention to

include branch prediction with fetch groups using **Talcott**'s teaching, thus providing the second table as fetch-based. This implementation would have been obvious because one of ordinary skill in the art would be motivated to increase branch prediction accuracy for many instructions, which is increasingly necessary for superscalar pipeline designs *(**Talcott**: column 2, lines 3-7; column 1, lines 54-67; **Patt**: abstract)*. Furthermore, it would have been obvious to implement a counter corresponding to each instruction in the fetch group for increased accuracy *(**Talcott**: column 4, lines 15-18)*.

In regard to claim 30, **Patt** and **Talcott** did not explicitly state the limitation *wherein said each said entry in said tables comprises a 1-bit counter* (inherent to 2-bit counters).

3. Claims 28-29 and 31-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Patt** et al., "Alternative Implementations of Hybrid Branch Predictors" in view of **Talcott** et al. (USPN 6,289,441).

In regard to claim 28, **Patt** disclosed the limitations:

- *A processing system comprising:*
  - *a first branch history table comprising a plurality of bimodally accessed entries, each entry for storing a first set of branch prediction bits* (page 253; item 2 under section 3.1);

- *a second branch history table comprising a plurality of entries each entry for storing a second set of branch prediction bits* (page 253, item 4, under section 3.1);
- *a selector for selecting, in response to a plurality of selection control bits, a set of prediction bits from a selected one of said sets of bits accessed from said first and second branch history tables* (page 255, section 4, 4.1 and Figure 2); *and*
- *a selector table comprising a plurality of entries, each entry for storing a plurality of selection control bits wherein the selection control bits are set as a function of a performance history of corresponding first and second sets of branch prediction bits stored in said first and second branch history tables* (page 255, section 4, 4.1 and Figure 2; page 252, section 2; each bit enables the selection of the single predictor in that it is part of the counter)

Patt did not explicitly state *fetch-based branch history table*. **Talcott** demonstrated that it was known at the time of invention to construct fetch-based branch history tables wherein a table produces a prediction value for multiple branches within a fetch group (column 3, line 58 to column 4, line 25). In **Patt**'s disclosed branch prediction scheme, it would have been obvious to one of ordinary skill in the art at the time of invention to include branch prediction with fetch groups using **Talcott**'s teaching, thus providing the second table as fetch-based. This implementation would have been obvious because one of ordinary skill in the art would be motivated to increase branch prediction

accuracy for many instructions, which is increasingly necessary for superscalar pipeline designs *(**Talcott**: column 2, lines 3-7; column 1, lines 54-67; **Patt**: abstract)*. Furthermore, it would have been obvious to implement a counter corresponding to each instruction in the fetch group for increased accuracy *(**Talcott**: column 4, lines 15-18)*.

In regard to claim 29, **Patt** did not explicitly state the limitation *wherein said entries of said selector table are accessed using fetch-based accessing*. **Talcott** demonstrated that it was known at the time of invention to construct fetch-based branch history tables wherein an entry represents a prediction value for multiple branches within a fetch group (column 3, line 58 to column 4, line 25). It would have been obvious to one of ordinary skill in the art at the time of invention to implement **Patt**'s single predictor selector mechanism with fetch groups as found in **Talcott**'s teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to increase branch prediction accuracy for many instructions, which is increasingly necessary for superscalar pipeline designs (**Talcott**: column 1, lines 54-67).

In regard to claim 31, **Patt** and **Talcott** did not explicitly state the limitation *wherein said first and second branch history tables and said selector table form a portion of a branch execution unit* (**Talcott**: Figure 1, element 100).

In regard to claim 32, **Patt** and **Talcott** further disclosed the limitation *wherein said branch execution unit forms a part of a microprocessor* (**Patt**: Abstract indicates superscalar processors).

In regard to claim 33, **Patt and Talcott** did not explicitly state the limitation *further comprising memory coupled to said microprocessor* (**Patt**: page 255, figure 2, note register and tables).

In regard to claim 34, **Patt** disclosed the limitations:

- *A method of performing branch predictions in a processing system including a bimodal branch history table, a branch history table and a selector table, the method comprising the substeps of:*
  - *accessing the bimodal branch history table to retrieve a first set of branch prediction bits* (page 253, item 2 under section 3.1);
  - *accessing the branch history table to retrieve a set of second branch prediction bits* (page 253, item 4 under section 3.1);
  - *selecting between the first and second sets of branch prediction bits in response to corresponding bits retrieved from the selector table* (page 255, section 4, 4.1 and Figure 2; page 252, section 2); *and*
  - *updating the selector table as a function of actual branch resolution* (Patt: page 252, section 2, first paragraph)

Patt did not explicitly state *fetch-based branch history table* with each entry *operable for containing bits representing a prediction value for a plurality of branches in a fetch group*. **Talcott** demonstrated that it was known at the time of invention to construct fetch-based branch history tables wherein a table produces a prediction value for multiple branches within a fetch group (column 3, line 58 to column 4, line 25; column 4, lines 15-18). In **Patt**'s disclosed branch prediction scheme, it would have been obvious to one of ordinary skill in the art at the time of invention to include branch prediction with fetch groups using **Talcott**'s teaching, thus providing the second table as fetch-based. This implementation would have been obvious because one of ordinary skill in the art would be motivated to increase branch prediction accuracy for many instructions, which is increasingly necessary for superscalar pipeline designs *(**Talcott**: column 2, lines 3-7; column 1, lines 54-67; **Patt**: abstract)*. Furthermore, it would have been obvious to implement a counter corresponding to each instruction in the fetch group for increased accuracy *(**Talcott**: column 4, lines 15-18). Wherein a sum of a number of bits in the first set of branch prediction bits and a number of bits in the second set of branch prediction bits is not less than a number of instructions in a fetch group* (provided by combination of fetch-base branch history described above).

In regard to claim 35, **Patt** and **Talcott** further disclosed the limitations:

- *wherein said step of updating the selector table comprises the substeps of:*

- *determining if at least one of the first set of branch prediction bits correctly predicts the corresponding branch resolution outcome* (**Patt**: page 252, section 2);
- *updating the corresponding entry in the selector table to a first logic value when the at least one of the first set of prediction bits correctly represents the branch resolution outcome* (**Patt**: page 252, section 2);
- *determining if at least one of the second set of branch prediction bits correctly predicts the branch resolution outcome* (**Patt**: page 252, section 2); *and*
- *updating the corresponding entry in the selector table to a second logical value when the at least one of the second set of branch prediction bits correctly represents the branch resolution outcome* (**Patt**: page 252, section 2).

In regard to claim 36, **Patt** and **Talcott** further disclosed the limitations:

- *determining if at least one bit of both the first and second sets of branch history bits correctly predict the branch resolution outcome* (**Patt**: page 252, section 2);
- *maintaining the current value of corresponding bits in the corresponding selector table entry when the at least one bit of both the first and second sets of branch prediction bits correctly predict the branch resolution outcome* (**Patt**: page 252, section 2);

- *determining if at least one bit of both the first and second sets of branch prediction bits incorrectly predict the branch resolution outcome* (**Patt**: page 252, section 2)*; and*
- *maintaining the current value of corresponding bits in the corresponding selector table entry when the at least one bit of both the first and second sets of branch history bits incorrectly predict the branch history outcome* (**Patt**: page 252, section 2).

In regard to claim 37, **Patt** and **Talcott** further disclosed the limitations:

- *determining whether at least one bit of both the first and second sets of branch prediction bits correctly predict the branch resolution outcome* (Patt: page 252, section 2)*;*
- *maintaining the current value of corresponding bits in the corresponding selector table entry when at the least one bit of both the first and second sets of branch prediction bits correctly predict the branch resolution outcome* (Patt: page 252, section 2)

Patt and **Talcott** did not explicitly state the limitation *updating the current selector table entry to a logic value associated with the fetch-based branch history table when neither of corresponding bits of the first and second sets of branch prediction bits correctly predicts the branch resolution outcome.* However, **Patt** did demonstrate that it was known at the time of invention that two-level branch prediction is the highest performance of the single predictors (page 253, first paragraph under bulleted items). It

would have been obvious to one of ordinary skill in the art at the time of invention to implement the **Patt** and **Talcott** selector table of single branch predictors with recording the fetch-based (or two level) table as the default choice when neither choice is correct as suggested by **Patt**'s own teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to gradually adjust the predictor to the more likely correct future choice, especially if there is no evidence not to make such an adjustment (i.e. neither predictor proving accurate).

In regard to claim 38, **Patt** and **Talcott** further disclosed the limitation *wherein said step of accessing the fetch-based branch history table comprises the substep of generating an address from at least some bits of a branching instruction and bits retrieved from a history register* (**Patt**: page 253, fourth bulleted item; **Talcott**: column 3, lines 58-63).

In regard to claim 39, **Patt** and **Talcott** further disclosed the limitation *wherein the history register comprises a shift register* (**Patt**: page 253, fourth bulleted item; page 255, Figure 2 and sections 4 and 4.1).

4. Claims 21-27 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Patt** et al., "Alternative Implementations of Hybrid Branch Predictors" in view of **Talcott** et al. (USPN 6,289,441) and in further view of **McFarling**, "Combining Branch Predictors".

In regard to claim 21, **Patt** disclosed the limitations:

- *Branch prediction circuitry comprising:*
  - *a bimodal branch history table comprising a plurality of entries each for storing a prediction value and accessed by selected bits of a branch address* (page 253, item 2 under section 3.1);
  - *a branch history table comprising a plurality of entries for storing a prediction value and accessed by a pointer generated from selected bits of said branch address arid bits from a history register* (page 253, item 4 under section 3.1); *and*
  - *a selector table comprising a plurality of entries each for storing plurality of selection bits and accessed by a pointer generated from selected bits from said branch address and bits from said history register* (page 255, section 4, first paragraph and section 4.1, last paragraph; page 255, right column , second paragraph, demonstrates pointer being generated; Figure 2), *each said selector bit used for selecting between a bimodal prediction value accessed from the bimodal history table and a prediction value accessed from said fetch-based history table* (page 252, section 2; page 255, section 4.1, first paragraph; page 252, section 2; each bit enables the selection of the single predictor in that it is part of the counter).

Patt did not explicitly state *fetch-based branch history table* with each entry *operable for containing bits representing a prediction value for a plurality of branches in a fetch group*. **Talcott** demonstrated that it was known at the time of invention to construct

fetch-based branch history tables wherein a table produces a prediction value for multiple branches within a fetch group (column 3, line 58 to column 4, line 25; column 4, lines 15-18). In **Patt**'s disclosed branch prediction scheme, it would have been obvious to one of ordinary skill in the art at the time of invention to include branch prediction with fetch groups using **Talcott**'s teaching, thus providing the second table as fetch-based. This implementation would have been obvious because one of ordinary skill in the art would be motivated to increase branch prediction accuracy for many instructions, which is increasingly necessary for superscalar pipeline designs *(**Talcott**: column 2, lines 3-7; column 1, lines 54-67; **Patt**: abstract)*. Furthermore, it would have been obvious to implement a counter corresponding to each instruction in the fetch group for increased accuracy *(**Talcott**: column 4, lines 15-18)*.

Patt did not explicitly state *wherein each fetch group is represented by a bit in the history register*. However, **Talcott** demonstrated that it was known at the time of invention to XOR the branch history register and the current fetch address (column 3, lines 58-63) and that the current fetch address can more accurately be referred to as the fetch bundle address (column 3, lines 1-7). **McFarling** demonstrated a history register recording the direction of the most recent *n* conditional branches (page 6, section 5, fourth sentence). It would have been obvious to one of ordinary skill in the art at the time of invention to implement the history register of **Talcott** with a register recording each fetch group as suggested by **McFarling** and **Talcott**'s teachings. This implementation would have been obvious because one of ordinary skill in the art would

be motivated to provide a history register which corresponds to "fetch group branch prediction" (column 1, line 63 to column 2, line 10). **Talcott** describes "fetch group branch prediction" using the concepts of a branch history register as in **McFarling**. In **McFarling** one instruction is fetched and applied to the history register (page 12, figure 10). **Talcott** is fetching a group and applying that group the history register (column 3, lines 58-63). Thus, it would have been obvious to implement **Talcott** with a history register designed for fetch groups.

In regard to claim 22, **Patt** and **Talcott** did not explicitly state the limitations:

- *circuitry for updating said bimodal and fetch-based branch history tables operable to:*
  - *set a corresponding entry in each of said bimodal and fetch-based branch history tables to a first value when a branch is taken at branch resolution time; and*
  - *set a corresponding entry in each of said bimodal and fetch-based branch history tables to a second value when a branch is not taken at branch resolution time.*

Patt demonstrated that it was known at the time of invention to utilize the most accurate branch prediction (page 255, section 4 and section 4.1, right column, top two paragraphs). It would have been obvious to one of ordinary skill in the art at the time of invention to implement **Patt** and **Talcott**'s hybrid branch prediction as updating entries in each of the bimodal and fetch-based tables with one or another value based upon the

accuracy of prediction as suggested by **Patt**'s own teachings. This implementation would have been obvious because one of ordinary skill in the art would be motivated to provide an accurate history as to which type of single predictor is correct in order to be more successful in future predictions.

In regard to claim 23, **Patt** and **Talcott** did not explicitly state the limitation *wherein said history register comprises a shift register and said branch prediction circuitry further comprises circuitry for updating said shift register by shifting in a preselected prediction value for each fetch group.* **McFarling** demonstrated that it was known at the time of invention to implement a hybrid branch prediction system with a *shifting* history register (page 6, section 5, first paragraph; pages 11-12, section 7). It would have been obvious to one of ordinary skill in the art at the time of invention to implement the hybrid branch system using fetch groups of **Patt** and **Talcott** with a shift register for the history register as found in **McFarling**'s teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to make use of existing (and thus well understood) technology when implementing hybrid branch predictors (further considering claim 21 above).

In regard to claim 24, **Patt** and **Talcott** further disclosed the limitations:

- *circuitry for updating said selector table operable to:*
- *update a corresponding bit in a selected entry in said selector table with a first value when a bimodal prediction value from said bimodal branch history table*

correctly represents a corresponding branch resolution (**Patt**: page 252, section 2, first paragraph)*; and*

- *update a corresponding bit in a selected entry in said selector table with a second value when a fetch-based prediction-value from said fetch-based branch history table correctly represents the corresponding branch resolution* (**Patt**: page 252, section 2, first paragraph).

In regard to claim 25, **Patt**, **Talcott** and **McFarling** further disclosed the limitation *wherein the plurality of selection bits are operable for selecting a first subset of prediction values from the bimodal branch history table and a second subset of prediction values from the fetch-based branch history table* (**Patt**: page 252, section 2; clearly the selector selects one branch predictor when it is useful and the other when it is useful).

In regard to claim 26, **Patt** and **Talcott** further disclosed the limitation *wherein said circuitry for updating said selector table is further operable to*

- *maintain a value in a selected entry in said selector table when corresponding values from said bimodal and fetch-based branch history tables both correctly represent a corresponding branch resolution* (**Patt**: page 252, section 2, first paragraph)*, and*
- *wherein said circuitry for updating said selector table is further operable to maintain a value in a selected entry in said selector table when neither values*

from said bimodal and fetch-based branch history tables correctly represent a corresponding branch resolution (**Patt**: page 252, section 2, first paragraph).

In regard to claim 27, **Patt** and **Talcott** did not explicitly state the limitation *wherein said circuitry for updating said selector table is further operable to set a value in a selected entry in said selector table to a value associated with said fetch-based table when corresponding values from said bimodal and fetch based branch history tables both do not correctly predict a corresponding branch resolution outcome.* However, **Patt** did demonstrate that it was known at the time of invention that two-level branch prediction is the highest performance of the single predictors (page 253, first paragraph under bulleted items). It would have been obvious to one of ordinary skill in the art at the time of invention to implement the **Patt** and **Talcott** selector table of single branch predictors with recording the fetch-based (or two level) table as the default choice when neither choice is correct as suggested by **Patt**'s own teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to gradually adjust the predictor to the more likely correct future choice, especially if there is no evidence not to make such an adjustment (i.e. neither predictor proving accurate).

In regard to claim 40, **Patt** and **Talcott** did not explicitly state the limitation *wherein said method further comprises the steps of updating the shift register by shifting in a prediction bit for each fetch group.* **McFarling** demonstrated that it was known at the time of invention to implement a hybrid branch prediction system with a *shifting* history

register (page 6, section 5, first paragraph; pages 11-12, section 7). It would have been obvious to one of ordinary skill in the art at the time of invention to implement the hybrid branch system using fetch groups of **Patt** and **Talcott** with a shift register for the history register as found in **McFarling**'s teaching. This implementation would have been obvious because one of ordinary skill in the art would be motivated to make use of existing (and thus well understood) technology when implementing hybrid branch predictors (further considering the **McFarling** rejection under claim's 21 and 23 above).

Response to Arguments

Applicant's arguments filed 02 September 2004 have been fully considered but they are not persuasive. Applicant argued: 1) no motivation to combine **Patt** and **Talcott**; 2) **Patt** and **Talcott** do not disclose 1-bit counters; 3) no motivation to implement selector table of claim 29 with fetch-based accessing; 4) no suggestion in prior art of updating selector table, no suggestion in particular that **Patt** updates predictors (page 21 of Brief); 5) no suggestion of fetch group represented by a bit in a history register; and 6) no suggestion of shifting in a shift register for each fetch group (Brief page 32). The arguments present are not persuasive primarily for lack of any convincing supporting evidence and for gross mischaracterization of the prior art. The above rejections present a proper *prima facie* rejection.

First, upon a relatively simple study of the two primary reference **Patt**, "Alternative Implementations of Hybrid Branch Predictors" and **Talcott**, "Method and Apparatus for Performing Multiple Branch Predictions Per Cycle", Applicant will realize

any "solving of **Talcott**'s problem" will also provide aid to **Patt**'s situation. Both teach methods of improving branch prediction for fetched instructions, both teach attempting to improve superscalar pipelines (**Patt**: abstract; **Talcott**: column 1, lines 30-67). The prior art teaches increasing instruction throughput with increased fetching of instructions and increased numbers of pipelines.

Second, as one of ordinary skill in the art and presumably Applicant, will appreciate a two bit counter will inherently comprise a one bit counter, as counters are built using flip-flops (note cited art attesting to this fact). Just because a two bit counter may produce the values 00, 01, 10 and 11 does not change the internal elements, which the counter is comprised.

Third, as explained above in reference to the first point, motivation for fetch-based processing is provided by a need to process more instruction more quickly as properly stated in the above rejections.

Fourth, Applicant provides numerous assertions that updating the selector table and even updating the individual predictors is lacking. This argument is counter to the teachings of the prior art as a whole and possibly indicative of Applicant's lack of understand of the prior art. Note page 252 of **Patt** stating, "Upon confirmation of a branch prediction, the counter would be incremented or decremented depending on which single-scheme predictor was correct". This, in a nutshell, explains the base workings of the counter base predictors.

Fifth and Sixth, clearly disclosed by **McFarling** as noted above. **McFarling** disclosed a history register and one of ordinary skill in the art considering **Talcott**'s fetch group predictions would recognize the obvious requirements for implementation.

Therefore, having addressed all of the raised points through remarks and rejection, the rejections are maintained.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Wood whose telephone number is (571)-272-3736. The examiner can normally be reached 9:00am - 5:30pm Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (571)-272-3719. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9306 for regular communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

William H. Wood
November 24, 2004

TODD INGBERG
PRIMARY EXAMINER